IN THE CLAIMS:

Please substitute the following listing of claims for the previous listing of claims:

1. (Currently Amended) An apparatus to treat an influent solution comprising ions to obtain a selectable ion concentration in a resultant effluent solution, the apparatus comprising:

(a) an electrochemical cell comprising:

(i) a housing comprising first and second electrodes;

(ii) a water-splitting ion exchange membrane between the first and second electrodes, the membrane comprising (i) a cation exchange surface facing the first electrode, and (ii) an anion exchange surface facing the second electrode; and

(iii) an influent solution inlet and an effluent solution outlet with a solution channel therebetween, the solution channel allowing the influent solution to flow past both the anion and cation exchange surfaces of the water-splitting ion exchange membrane and thereby form the effluent solution; and

(b) a variable voltage supply capable of maintaining the first and second electrodes at a plurality of <u>selectable</u> voltage levels during an ion exchange stage <u>such that each selectable voltage level has a different magnitude and provides a different ion concentration range in the effluent solution</u>.

2. (Original) An apparatus according to claim 1 wherein the voltage levels are time averaged voltage levels.

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4. (Original) An apparatus according to claim 2 wherein the time averaged voltage levels each have a different magnitude but substantially the same polarity.

5. (Original) An apparatus according to claim 2 wherein the ion exchange stage comprises an ion removal step.

6. (Original) An apparatus according to claim 2 wherein the ion exchange stage comprises an ion rejection step.

7. (Original) An apparatus according to claim 1 wherein the variable voltage supply is a phase control voltage supply.

8. (Original) An apparatus according to claim 1 wherein the variable voltage supply provides a variable magnitude pulsed voltage.

9. (Original) An apparatus according to claim 1 wherein the variable voltage supply comprises a switching voltage supply with pulse width modulation.

10. (Original) An apparatus according to claim 1 wherein the variable voltage supply provides a fixed magnitude pulsed voltage.

11. (Original) An apparatus according to claim 1 comprising a voltmeter to measure the voltage bias in the cell and generate a voltage signal, an ammeter to measure the current in the cell and generate a current signal, and a controller which determines the ion concentration in the solution from the ratio of the voltage and current signals and sends a control signal to the variable voltage supply to adjust the voltage level applied to the electrodes in response to the ion concentration.

12. (Original) An apparatus according to claim 1 comprising:

(1) an ion sensor to (i) measure an ion concentration of the influent solution, at least partially treated solution, or effluent solution, and (ii) generate an ion concentration signal, and

(2) a controller to receive the ion concentration signal and send a control signal to the variable voltage supply to adjust the voltage level in response to the ion concentration signal.

13. (Currently amended) An apparatus to treat an influent solution comprising ions to obtain a selectable ion concentration in an effluent solution, the apparatus comprising:

(a) an electrochemical cell comprising:

(i) a housing comprising first and second electrodes;

(ii) a water-splitting ion exchange membrane positioned between the first and second electrodes, the membrane comprising (i) a cation exchange surface facing the first electrode, and (ii) an anion exchange surface facing the second electrode; and

(iii) an influent solution inlet and an effluent solution outlet with a solution channel therebetween, the solution channel allowing the influent solution to flow past both the anion and cation exchange surfaces of the water-splitting ion exchange membrane and thereby form the effluent solution;

(b) an ion sensor to measure an ion concentration in the influent solution, at least partially influent solution, or effluent solution, and generate an ion concentration signal;

(c) a variable voltage supply to maintain the first and second electrodes at a plurality of different selectable voltage levels during an ion exchange stage such that each selectable voltage level has a different magnitude and provides a different ion concentration range in the effluent solution; and

(d) a controller to receive the ion concentration signal from the ion meter and send a control signal to the variable voltage supply to adjust the voltage level applied to the first and second electrodes in response to the ion concentration signal to achieve a predefined ion concentration range in the effluent solution.

14. (Original) An apparatus according to claim 13 wherein the variable voltage supply is capable of providing voltage levels that are time averaged voltage levels during the ion exchange stage.

15. (Currently amended) A method of treating an influent solution comprising ions to control the concentration of ions in an effluent solution, the method comprising:

(a) flowing the influent solution past both anion and cation exchange surfaces of a water-splitting ion exchange membrane to form the effluent solution;

(b) maintaining a time averaged electric field across the cation and anion exchange surfaces of the water-splitting membrane; and

(c) varying the strength of the time averaged electric field during ion exchange of the influent solution by selecting one of a plurality of selectable voltage levels that each have a different magnitude to control the ion concentration of the effluent solution.

16. (Original) A method according to claim 15 wherein the strength of the time averaged electric field is varied to achieve a predefined ion concentration range in the effluent solution.

17. (Original) A method according to claim 15 comprising measuring an ion concentration of the at least partially treated influent solution and varying the strength of the time averaged electric field in response to the measured ion concentration.

18. (Original) A method according to claim 15 comprising varying the strength of the time averaged electric field by varying the time-averaged voltage level of a variable-magnitude pulsed voltage applied to electrodes about the cation and anion exchange surfaces of the water-splitting membrane.

19. (Original) A method according to claim 15 comprising varying the strength of the time averaged electric field by varying the duty cycle of a fixed-magnitude pulsed voltage level applied to electrodes about the cation and anion exchange surfaces of the water-splitting membrane.

20. (Currently amended) A method according to claim 15 comprising measuring the voltage and current through the solution and water-splitting membrane and determining an ion concentration in the solution from the ratio of the voltage and current measurements.

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59. (New) A method of treating an influent solution comprising ions to control the concentration of ions in an effluent solution, the method comprising:

(a) flowing the influent solution past both anion and cation exchange surfaces of a water-splitting ion exchange membrane to form the effluent solution;

(b) maintaining a time averaged electric field across the cation and anion exchange surfaces of the water-splitting membrane; and

(c) setting the strength of the time averaged electric field during ion exchange of the influent solution by selecting one of a plurality of selectable voltage levels that each have different magnitude and provide a different ion concentration range in the effluent solution.

60. (New) A method according to claim 59 comprising measuring an ion concentration of at least partially treated influent solution and varying the strength of the time averaged electric field in response to the measured ion concentration.

61. (New) A method according to claim 59 comprising varying the strength of the time averaged electric field by varying the time-averaged voltage level of a variable-magnitude pulsed voltage applied to electrodes.

62. (New) A method according to claim 59 comprising varying the strength of the time averaged electric field by varying the duty cycle of a fixed-magnitude pulsed voltage level applied to electrodes.

63. (New) A method according to claim 59 comprising measuring the voltage and current through the solution passing across the water-splitting membrane and determining an ion concentration in the solution from the ratio of the voltage and current measurements.